

Nalco Docket No. 7774  
Customer No. 49459

### REMARKS

Claims 1, 2, 8, 10, 11, 32, and 33 are pending in this Application. Claims 12 to 29 stand withdrawn. Applicants have amended Claims 1, 2, 8, and 11 to clarify the elements of those claims and have added New Claims 34 and 35. No new matter has been added.

### CLAIM INTERPRETATION

In addition to the rejections addressed below, the Examiner requested that Applicants clarify interpretation of certain claim elements. The Examiner states, "Two structures appear to be set forth as the 'metal-silicate lattice microstructure' and the macrostructure as amorphous or crystalline, wherein the microstructure results from the presence of the metal cation formation with the silicic acid to form the colloidal particles." (Office Action at Page 3). Additionally, the Examiner states, "Applicants declaration [submitted with Applicants' response of September 4, 2007] is an opinion declaration without evidentiary evidence and appears to be inconsistent with Claim 10, which sets forth copolymerization of an alkali metal and/or alkaline earth metal into the lattice." (Office Action at paragraph 13, page 6).

To the contrary, Applicants respectfully assert that no such inconsistency exists. The Specification, on page 10, lines 12 to 14 states, "In an embodiment, the metal silicate solution and the silicic acid solution are selectively added to the heel to control the position of the metal within the solid phase of the colloid as desired." Dr. Holland's declaration explained the type of interaction disclosed in Watanabe was ion-exchangeable and the structures disclosed therein did not display covalent interactions with the silica as in the claimed invention. The claimed invention includes covalently bound metal that is part of the metal-silicate lattice and is not ion-exchangeable. Rather, the metal of the claimed invention is permanently and covalently associated with the metal-silicate lattice.

The Examiner further set forth that the amendments have not clarified the claims regarding amorphous and crystalline characterization. (Office Action at page 6, paragraph 14). Applicants respectfully point the Examiner's attention to page 11, lines 10 to 13, which provide,

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"For example, the colloidal compositions as described above can be further processed to form a crystalline structure, such a crystalline silicate, a crystalline metallosilicate including a zeolite, the like and combinations thereof." Formation of such a crystalline structure does not affect the claimed covalent relationship in the metal-silicate lattice. The claimed invention includes a covalent metal-silicate lattice whether the colloidal particles are amorphous and generally spherical colloidal particles or in a crystalline state.

Applicants further ask the Examiner to review the Specification at page 9, lines 2 to 3, which state, "The solid phase in an embodiment is amorphous and has a number of particles that are generally spherical in shape." Also, Page 11, lines 6 to 7 of the Specification state, "The multiple layered colloid particles of the present invention are generally spherical in shape." The Specification continues to describe the lattice structure as:

A colloid with the metal dispersed within the silicate (i.e., incorporated into the particle framework as discussed above), such as having a homogenous distribution of the metal component throughout the entire solid phase of the colloid. Not wishing to be bound by any particular theory, it is believed that the dispersion and loading of the metal is obtained as the copolymerization forms a metal-silicate lattice throughout the microstructure of the solid phase. (Page 9, lines 18 to 23).

The microstructure of the solid phase thus includes colloidal particles having an amorphous and generally spherical shape with a copolymerized metal-silicate lattice within the particles. And the colloidal particles may be further processed into crystalline form.

The Examiner also expressed that Claim 11 defines only an upper limit for the metal species in the compositions. Applicants have added a lower limit in Claim 11 to address this concern.

#### CLAIM REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The Office Action rejected Claims 1, 2, 8, 10, 11, 32, and 33 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention.

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The Office Action states, "It is unclear whether Applicants intend the lattice structure to define the microscopic arrangement between silica and metal cations in both amorphous and crystalline materials or that said materials are exclusive to crystalline materials." Applicants point the Examiner's attention to the Specification on page 11, lines 10 to 13, which provides, "For example, the colloidal compositions as described above can be further processed to form a crystalline structure, such a crystalline silicate, a crystalline metallosilicate including a zeolite, the like and combinations thereof." Such a crystalline structure does not affect the claimed covalent relationship in the metal-silicate lattice. The claimed invention includes a covalent metal-silicate lattice whether the colloidal particles are amorphous and generally spherical or in a crystalline state.

Accordingly, Applicants respectfully submit that this rejection has been overcome and respectfully request that this rejection be withdrawn.

CLAIM REJECTIONS UNDER 35 U.S.C. §§ 102(a) and (b)

The Office Action rejected Claims 1 and 2 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,597,512 to Watanabe et al. ("Watanabe"). Applicants respectfully disagree with and traverse this rejection.

In response to Applicants' previous arguments, the Examiner contends, "The alkaline earth metals are in solution as ions and are negligible in the Watanabe reference." (Office Action at page 6, paragraph 15). Applicants respectfully assert that the Examiner has misinterpreted the term "negligible." Applicants previously set forth that the interaction of such metals ions are negligible when the ions are in solution. Even if the metal ions are present in the extremely low quantities as in Amended Claim 2, the interaction between the silica and the metal is covalent and not negligible. Thus, Applicants used the term "negligible" to describe such interaction, not the amount of metal.

As noted in the Office Action at page 4, Watanabe discloses the use of MgO and CaO in the form of silica salts with silicic acid. Applicants respectfully assert, however, it is well known that the use of magnesium and calcium in such a fashion creates a non-covalent, ion-

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exchangeable interaction between the metal ions and the silica. This type of interaction indicates that these cations are only in solution and are not covalently bound to the silica framework, in contrast to the claimed invention. Watanabe indicates the presence of alkaline earth cations, added based on CaO and MgO, which lead to cations in solution and not as part of a metal-silicate lattice.

Wattanabe thus fails to disclose a synthetic metal-containing colloidal silicate composition as in Amended Claim 1 (and Claim 2 by dependency). In particular, Wattanabe fails to disclose a metal covalently copolymerized and incorporated into a metal-silicate lattice solid phase having colloidal particles. Therefore, Applicants respectfully submit that these claims are patentably distinct over Wattanabe and in condition for allowance. Applicants accordingly respectfully request that this rejection be withdrawn.

The Office Action also rejected Claims 1, 2, 8, 10, 32, and 33 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,287,086 to Finlayson et al. ("Finlayson"). Applicants respectfully disagree with and traverse this rejection.

The Examiner responded to Applicants' previous arguments with regard to this rejection and stated, "Clay is a naturally occurring layered silicate with metals copolymerized within the lattice." (Office Action at page 6, paragraph 16). Finlayson discloses modified naturally occurring materials. In contrast, Claim 1 is unequivocally directed to a synthetic material, which by definition is non-naturally occurring and is thus distinct from any naturally occurring material.

Thus, Finlayson fails to disclose a synthetic metal-containing colloidal silicate composition as in Amended Claim 1. In particular, Finlayson fails to disclose a metal covalently copolymerized and incorporated into a metal-silicate lattice solid phase having colloidal particles.

Applicants therefore respectfully assert that Amended Claim 1 (and Amended Claims 2 and 8, and Claims 10, 32, and 33 that depend therefrom) is patentably distinct from Finlayson and in condition for allowance. Applicants respectfully request that this rejection accordingly be withdrawn.

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The Office Action further rejected Claims 1, 2, 8, 10, 11, 32, and 33 under 35 U.S.C. § 102(b) as being anticipated by Mintova and Valtchev, "Effect of silica source on the formation of nanosized silicalite-1: an in situ dynamic light scattering study," Microporous and Mesoporous Materials, 55 (2002): 171 to 179 ("Mintova"). Applicants respectfully disagree with and traverse this rejection.

With regard to Mintova, the Examiner believes the sodium employed in the Mintova process is not removed. (Office Action at page 7, paragraph 17). Applicants respectfully reassert that silicalite-1 nanocrystals (as disclosed in Mintova) are known in the art to be void of covalently attached metal. The presence of residual ion-exchangeable, non-covalently bound metal in the Mintova materials is irrelevant. Likewise, the Examiner's assertion that the zeolite of Mintova reads on the claimed invention is inaccurate. (Office Action at page 7, paragraph 18). As stated, it is known in the art that silicalite-1 is purely siliceous and void of metal. Thus, crystallized silicalite-1 is also purely siliceous.

Mintova thus fails to disclose a synthetic metal-containing colloidal silicate composition as in Amended Claim 1. Mintova discloses neither a metal-silicate lattice solid phase having colloidal particles nor a metal covalently copolymerized and incorporated into the lattice within the colloidal particles. Rather, Mintova discloses methods of forming silicalite-1 nanocrystals, which are well known to be void of covalently attached (i.e., non ion exchangeable) metal.

Therefore, Applicants respectfully assert that Claim 1 (and the other rejected claims by dependency) is patentably distinct from Mintova and in condition for allowance. Applicants respectfully request that this rejection be withdrawn.

The Office Action rejected Claims 1, 2, 8, 10, 11, 32, and 33 under 35 U.S.C. § 102(a) as being anticipated by Cundy et al., "Some observations on the preparation and properties of colloidal silicates. Part I: synthesis of colloidal silicalite-1 and titanosilicalite-1 (TS-1)," Microporous and Mesoporous Materials, 66 (2003): 143 to 156 ("Cundy"). Applicants respectfully disagree with and traverse this rejection.

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In contrast to the Examiner's statement, "Applicants' claims do not require covalently bound metals," Applicants respectfully assert that Amended Claim 1 requires "a metal covalently copolymerized and incorporated into said lattice within the colloidal particles." (Office Action at page 7, paragraph 19). Amended Claims 2 and 11 further limit Claim 1 to a specified amount of covalently bound copolymerized metal.

Cundy fails to disclose a synthetic metal-containing colloidal silicate composition including a metal-silicate lattice solid phase with metal covalently copolymerized and incorporated within colloidal particles of the solid phase. On the contrary, Cundy merely uses structure directors to synthesize zeolite crystals. It is well known in the art that the Cundy silicalite-1 product is purely siliceous and thus void of such covalently copolymerized and incorporated metal.

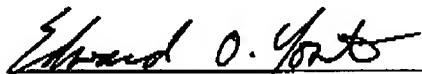
Therefore, Applicants respectfully assert that Amended Claim 1 (and Amended Claims 2, 8, and 11, and Claims 10, 32, and 33 by dependency) is patentably distinct over Cundy and in condition for allowance. Applicants respectfully request that this rejection be withdrawn.

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**CONCLUSION**

In view of the foregoing amendments and remarks, Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 112, second paragraph, and 35 U.S.C. §§ 102(a) and 102(b). Applicants respectfully assert that all pending claims in this Application are in condition for allowance and earnestly solicit early notice to this effect.

Respectfully Submitted,



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